A REVISED SYNONYMY OF *NEMATOGOBIUS MAINDRONI* (SAUVAGE, 1880) (TELEOSTEI, GOBIIDAE)

by

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ABSTRACT. - The taxonomic stata of the West African gobiid species *Nematogobius maindroni* (Sauvage) and *Nematogobius ansorgii* Boulenger are revised by direct observation of the type specimens and reference to type descriptions. Previous confusion of longitudinal series scale counts for the species are clarified. On the basis of morphology, the taxa are considered conspecific. *N. ansorgii* is synonymised with *N. maindroni*. The distribution of *N. maindroni* is briefly stated.

RÉSUMÉ. - La révision du statut taxinomique de deux gobiidés de l'Afrique de l'Ouest, *Nematogobius maindroni* (Sauvage) et *Nematogobius ansorgii* Boulenger, a été réalisée à la suite de l'observation directe des types et par référence aux descriptions originales de ces types. Les confusions précédentes dans le décompte du nombre des écailles en série longitudinale pour les espèces sont éclaircies. Sur la base de critères morphologiques, ces deux taxons sont considérés comme appartenant à la même espèce. *N. ansorgii* est mis en synonymie avec *N. maindroni*. La distribution de *N. maindroni* est indiquée brièvement.

Key-words: Gobiidae, *Nematogobius ansorgii*, *N. maindroni*, West Africa, Taxonomy.

Boulenger (1910) established the generic name *Nematogobius* for the species *ansorgii*, which differs from other gobiid species by possessing a barbel on each anterior nostril tube and a pair of mental barbels. *Gobius maindroni* Sauvage, 1880 was included in *Nematogobius* by Daget and Iltis (1965) on the basis of the characteristic barbel morphology; the presence of mental barbels had not been mentioned in Sauvage's (1880) type description. Both species are reported from similar West African ecotopes. Pfaff (1933) placed a third species, *N. brachynemus* also from West Africa, in the genus. It can be distinguished from the other species by its more extensive squamation of the occipital and upper opercular regions, its notably shorter mental barbels, and the presence of pectoral fin rays free from the fin membrane (Pfaff, 1933; Fowler, 1936; Delais, 1951; Daget and Iltis, 1965; Thys van den Audenaerde, 1967).

Sauvage (1880) stated that the holotype of *Gobius maindroni* has 36 scales in longitudinal series. When Daget and Iltis (1965) assigned this species to *Nematogobius* they made a corresponding count of only *ca.* 32 scales on the type, and listed the range for *N. maindroni* as 30 to 34 scales. Boulenger (1910) had stated that the types of *N. ansorgii* have 37 to 40 scales in longitudinal series. Daget and Iltis (1965) then used the difference in longitudinal series scale counts as a key character for distinguishing between *N. maindroni* and *N. ansorgii*.

However, Thys van den Audenaerde (1967) questioned Boulenger's (1910) scale counts of 37 to 40 for *N. ansorgii*. Thys (1967) did not directly observe the syntypes of *N. ansorgii*, but from a figure of a type he estimated only about 34

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Cybium 1990, 14(1): 27-35.

scales in longitudinal series. This is comparable to *N. maindroni* following Daget and Iltis' (1965) counts. Thys (1967) commented on Boulenger's practice of including the scales on the caudal fin in his counts and concluded that the variation in scale counts probably does not indicate two separate species, but rather reflects different methods of counting. Nevertheless, Thys made no formal synonymy of the taxa concerned.

In the current study the type specimens of both *N. maindroni* and *N. ansorgii* have been examined. The purpose of this note is to provide an account of some information which is instrumental to a review of the taxonomic status of these species.

The presence of two mental barbels is also a feature of the monotypic genus *Sufflogobius* Smith, 1956, and this genus has previously been synonymised with *Nematogobius* (Miller, 1981; Maugé, 1986). However, most recently Miller (1990) removed *Sufflogobius* from synonymisation with *Nematogobius*, regarding it as a valid genus. Hence *Sufflogobius* is excluded from discussion.

MATERIAL AND METHODS

Material

Body lengths given as SL + CL (abbreviations listed below).

Nematogobius maindroni (Sauvage): Holotype (MNHN A.1771), one male (X-rayed), 60.7 + 12.85 mm, Senegal; (BMNH 1915.4.13.64), one specimen of undetermined sex, 39.6 + 10.2 mm, N. Sherbo district, rivers near the coast, Sierra Leone.

Nematogobius ansorgii Boulenger: Syntypes (BMNH 1911.6.1.168-9), one female, 65.1 + 12.85 mm, and one specimen of undetermined sex, 45.35 + 10.15 mm (both specimens X-rayed), Bengo R., Cabiri, Angola; (BMNH 1915.3.9.5-7), two males, 54.3 mm + d and 52.3 + 14.75 mm, and one female, 42.9 + 9.6 mm, Bengo R., Quifangondo, Angola; (BMNH 1912.4.1.174), one male, 48.35 + 12.4 mm, Geba R., Guinea Bissau; (BMNH 1912.4.1.507), one specimen of undetermined sex, 37.4 + 9.75 mm, Chiloango Town, Zaire; (BMNH 1981.4.8.17), one specimen of undetermined sex, 27.9 + 7.9 mm, Ferguson's Gulf, Lake Rudolf, Kenya ? (see further in section 'Habitat and distribution').

Characters observed

SL = standard body length; TL = total body length; CL = caudal fin length; d = caudal fin damaged; HL = head length (anterior of snout to midline at level of upper origin of opercle); E = eye diameter; I(b) = interorbital width (bony part only); I(s) = interorbital width (including soft tissue lateral to bony part of interorbital); D1 and D2 = first and second dorsal fin rays; A = anal fin rays; P = pectoral fin rays; V = pelvic fin rays; C = caudal fin rays (expressed as branched segmented rays plus unbranched segmented rays, unless stated otherwise); PD = predorsal scales (counted anteriorly from origin of D1, in series along dorsal midline); LL = scales in longitudinal series (expressed as number of scales along lateral midline plus number of scales on origin of caudal fin, unless stated otherwise); TR = scales in transverse series (from origin of A posterodorsally to base of D2); VC = vertebral count (expressed as abdominal vertebrae plus caudal vertebrae inclusive of urostyle); DPS = dorsal pterygiophore sequence (expressed following Birdsong *et al.*, 1988); AP = number of anal pterygiophores anterior to the first haemal spine (following Birdsong *et al.*, 1988); EP = number of epural bones. Terminology of head canal pores and series of free neuromasts follows Miller (1986), based on Sanzo (1911).

BD = body depth (not measured in this study, but referred to in discussion of original type descriptions).

Abbreviations in Figures: AN and PN = anterior and posterior nostrils; ANb = barbel of anterior nostril; mb = mental barbel.

Collections

BMNH = British Museum (Natural History), London; MNHN = Muséum national d'Histoire naturelle, Paris.

RESULTS AND DISCUSSION

Comparison of type specimens *N. maindroni* (Sauvage) and *N. ansorgii* Boulenger

The following comparisons refer to data resulting principally from personal examination of type material. Supplementary information from literature review is only cited where the relevant literature refers to direct observation of the type material. As a result of the age and condition of preservation of the *N. maindroni* holotype, the present comparisons of morphometrics are confined to some characters which may be cross-referenced to descriptions of the fresh specimens. All type specimens are comparable in the following respects.

General description

Some morphometrics are summarised in Table I; most show overlapping ranges or close similarity in values (differences in reported HL are considered not too great to have arisen from minor populational diversity, or variability in measurement techniques of earlier authors).

Table I: Morphometric data for *Nematogobius maindroni* and *Nematogobius ansorgii* type specimens. Proportional measurements expressed by previous authors are converted to percentage measurements. See text for explanation of abbreviations.

		N. maindroni		N. ansorgii	
		after Sauvage (1880)	present study	after Boulenger (1910)	present study
as % TL,	BD	16.7	-	16.7-20.0	-
	HL	22.2	22.4	28.6-30.0	-
as % SL,	CL	20.0	21.2	-	19.7-22.4
as % HL,	E	22.2	21.2	25.0	-
as % E,	I(b)	see text	≈8.6	see text	-
	I(s)	-	≈25.7	-	-

Body nearly cylindrical anteriorly, more compressed posteriorly. Snout rounded and short, not exceeding length of eye.

Barbels of anterior nostrils longer than broad. Nasal barbels of *N. maindroni* holotype appear slightly shorter than those of *N. ansorgii* syntypes. However, this difference is marginal (not comparable to the large differences in mental barbel length which have been used to distinguish *N. brachynemus* from other species of *Nematogobius*) and may have been exacerbated by, or resulted directly from the longer period of preservation of the *maindroni* type (since 1880) relative to the *ansorgii* types (since 1910). Mental barbels larger than nasal barbels in all type specimens, their length approximately equal to diameter of pupil. Posterior nostril pore-like.

Jaws equal, or with lower jaw slightly prominent. Mouth oblique (when mouth of *N. maindroni* holotype closed). Angle of jaw below middle of eye. Teeth of upper and lower jaws relatively small, unicuspid, posteriorly recurved, and in several rows. In *N. maindroni* holotype upper and lower jaws bear teeth in outer row which are larger than those of inner rows (except for mid-lateral teeth of inner

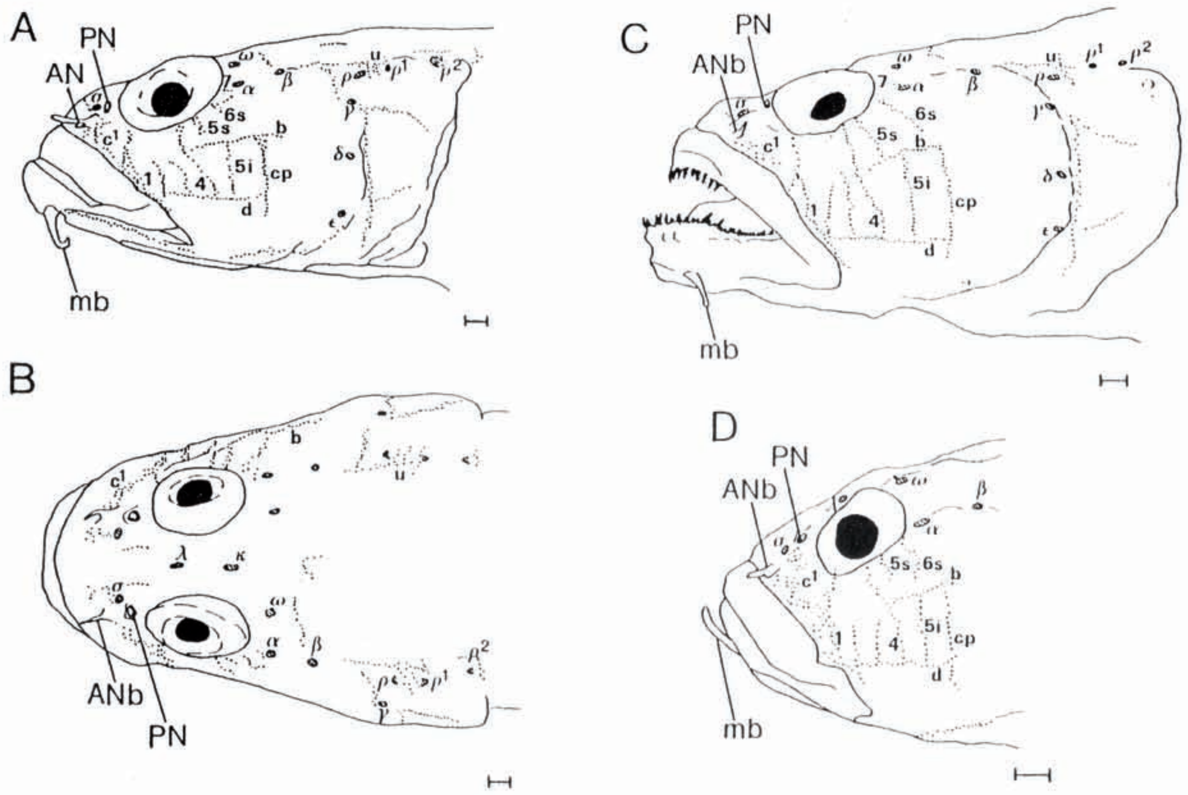

Fig. 1: Lateral-line head canal and sensory neuromast arrangements in specimens of *N. ansorgii* and *N. maindroni*. Canal pores are cross-hatched and labelled with italicised greek letters; neuromast rows are labelled with bold numerals or roman lettering; transverse rows c are labelled 1 to 7, and those rows divided by b are labelled as superior (s) or inferior (i) sections; row cp is equivalent to 6i. Scale bars = 1 mm. (A) and (B): Syntype of *N. ansorgii* (BMNH 1911.6.1.168-9; SL 65.1 mm). (A) Lateral view: composite diagram constructed from views of both sides of head. (B) Dorsal view: note pore *ω* on left side of head is indistinct and its approximate position is marked. (C) *N. maindroni* holotype (MNHN A.1771) in lateral view, composite diagram constructed from views of both sides of head. (D) *N. ansorgii* (BMNH 1912.4.1.174), lateral view of anterior of head.

row on lower jaw, which are also large); in *N. ansorgii* syntypes tooth size appears more consistent. 'Tongue' broad, rounded, and attached to floor of mouth for most of its length.

Eyes large and dorsolateral. Type descriptions (Sauvage, 1880; Boulenger, 1910) state interorbital is narrow in each taxon; current observations confirm this (see also Table I, but note values given are approximate).

Types exhibit an overlapping range in standard lengths (Table II).

Fins (Table II): all fin ray counts identical or show overlapping ranges. Outer (dorsal) rays of pectoral fin not free from fin membrane. V, I,5; pelvic fins united by well-developed frenum. Caudal fin rounded or subacuminate.

Table II: Standard lengths, meristics and osteological data for *Nematogobius maindroni* and *Nematogobius ansorgii* type specimens. See text for explanation of abbreviations. *: Total count for all scales in longitudinal series, inclusive of scales on caudal fin. **: See notes in section 'vertebral column/median fin osteology' of 'Results and Discussion'.

	N. maindroni Holotype MNHN A. 1771	N. ansorgii Syntypes BMNH 1911.6.1. 168-169	
SL /mm	60.7	65.1	45.35
D1	VI	VI	VI
D2	I,11	I,11	I,11
A	I,10	I,10	I,9
C	15+2	13+3	15+2
P	19	19	19
LL	32/33+1	34*	32+2
TR	10/11	11/12	11/12
PD	8	≈10	≈8
VC	10+17**	10+17	10+17
DPS	3-22110	3-22110	3-22110
AP	2	2	2
EP	1	1?	-

Head lateral-line system (Fig. 1A-C): condition of type specimens render comparisons difficult for some characters, but types generally appear comparable. Anterior oculoscapular canal present, terminating anteriorly at pore σ between anterior and posterior nostrils, and incorporating pores λ (single), κ (single), ω (indistinct on left side of head in 65.1 mm SL syntype of *N. ansorgii*), α, β, and ρ; short posterior oculoscapular canal with pores ρ^1 and ρ^2 (these indistinct on left side of head of *N. maindroni* holotype). Preopercular canal incorporating pores τ, δ, and ε.

Sensory neuromasts abraded in type specimens (see below), but composite views for both sides of head indicate a similarity in neuromast arrangements. Rows c^1 relatively proliferate dorsal to upper lip. Seven transverse suborbital neuromast rows *c*; rows 5 *c* and 6 *c* divided into superior and inferior portions by longitudinal row *b*, which extends anteriorly almost to fourth row *c*. Row 7 *c* short, consisting of only a few neuromasts adjacent to pore α. Longitudinal row *d* not extending posteriorly beyond the most posterior row *c* below row *b* (*cp*), and *cp* extends ventrally below *d*. Short section of longitudinal neuromast row *u*, and one or two short transverse rows between pores ρ and ρ^1.

Suborbital neuromast arrangements show slight differences between the type specimens with regard to the proliferation of preorbital neuromast rows c^1 dorsal to the upper lip, and the lengths of the superior sections of rows 5 *c*, 6 *c* and position of 7 *c* relative to pore α. However, these differences are relatively minor and most probably result from abrasion of papillae in the preserved specimens, or are perhaps part of a small continuum of variability in neuromast arrangements (see further comments in reference to non-type material).

Squamation (Table II): LL, TR and PD counts show overlapping ranges. Opercle, preopercle, and suborbital region of head naked; nape with a few small, cycloid scales in narrow, predorsal series not extending anteriorly onto occipital. Flanks bear large ctenoid scales. Scales of *N. maindroni* holotype slightly abraded, but LL count is considered reliable and is more comparable to Daget and Iltis' (1965) count of 32, than to Sauvage's (1880) original description of 36 scales. Little or no scale abrasion on syntypes of *N. ansorgii*, hence LL count confirms Thys van den Audenaerde's (1967) suspicion of Boulenger's (1910) original description of 37 to 40 scales (see above).

Vertebral column/median fin osteology (Table II): DPS and AP identical for all type specimens; EP probably identical but epurals indistinctly visible in the X-ray of only one *N. ansorgii* syntype. In *N. maindroni* holotype the fourth and fifth abdominal centra are fused (recognisable by two pairs of neural and haemal spines on centrum). Accounting for both fused centra, VC is identical to that of the *N. ansorgii* syntypes (ie., 10 + 17).

Coloration: condition of *N. maindroni* holotype prevents any direct comparison of it with *N. ansorgii* syntypes. Sauvage's (1880) original description of *G. maindroni* states the head is brown and body yellow-brown with numerous vertical bands; dorsal fins with misted brown spots; anal, pelvic and pectoral fins speckled black; small black spot on upper part of pectoral fin base; caudal fin with brown bars at its base. Boulenger's (1910) original description of *N. ansorgii* states the body is yellowish-brown above, with 3 or 4 ill-defined dark cross-bars (I find the bars faded, but count count *ca.* 5); dorsal and caudal fins spotted with dark brown (I find the spots on the dorsal fins arranged in irregular, longitudinal bands); round, blackish spot on upper part of pectoral fin, near its base (I find this spot faded, but still visible). Hence all information indicates a strong similarity between coloration and pigmentation of the type specimens under comparison.

Synonymy of *N. ansorgii* Boulenger with *N. maindroni* (Sauvage)

In conclusion, the type specimens of *N. maindroni* (Sauvage) and *N. ansorgii* Boulenger appear very similar in most morphological characters discussed. Longitudinal series scale counts, which have been used previously to distinguish the taxa, are found to be not significantly different. Any morphological variability between the types is relatively minor, and does not seem to justify a specific distinction between them. Consequently, *N. maindroni* (Sauvage) and *N. ansorgii* Boulenger are regarded as conspecific, and a revised synonymy is given below.

***Nematogobius maindroni* (Sauvage, 1880).**

Gobius maindroni Sauvage, 1880, *Bull. Soc. Philom. Paris*, 7 (4): 40.

Gobius mendroni: Rochebrune, 1882, *Act. Soc. Linn. Bordeaux*, 4 (6): 109; 1883: 86. - Osorio, 1895: 61; 1898: 187, 202; 1915: 103.

Nematogobius ansorgii Boulenger, 1910, *Ann. Mag. nat. Hist.*, (8) 6: 560.

Gobius maindroni: Boulenger, 1916: 27; 1919: 36. - Pellegrin, 1921: 637; 1923: 308; 1929a: 453. - Holly, 1930: 273. - Fowler, 1936: 1006, 1317. - Cadenat, 1950: 261. - Blache, 1962: 72. - Blache *et al.*, 1970: 400.

Nematogobius ansorgii: Boulenger, 1916: 40, fig.3. - Delais, 1951: 345, 363, figs.24-26. - Poll, 1951: 279. - Cadenat, 1960: 1409; 1961: 243. - Daget and Iltis, 1965: 298. - Thys van den Audenaerde, 1965: 317; 1967: 116. - Daget and Stauch, 1968: 44. - Miller, 1981: 8; - Maugé, 1986: 377.

Nematogobius ansorgei: Pellegrin, 1921, *C. r. Ass. fr. Avanc. Sci., Congrès de Rouen*: 637; 1923: 312. - Cadenat, 1947: 32. - Bassindale, 1961: 510. - Blache *et al.*, 1970: 394, fig.1009. - Penrith, 1978: 187.

Gobius uaindroni: Pellegrin, 1929b, *Bull. Soc. Zool. Fr.*, 54: 361.

Nematogobius ansori: Herre, 1946, *Proc. Biol. Soc. Wash.*, 59: 126.

Gobioides ?: Irvine, 1947: 192 (f. Bassindale, 1961).

Nematogobius sp. vel *ansorgii*: Cadenat, 1950, *Inst. franç. Afr. noire*: 308.

? *Gobius* sp. aff. *maindroni*: Cadenat, 1950, *Inst. franç. Afr. noire*: 309.

Nematogobius maindroni: Daget and Iltis, 1965, *Mém. I.F.A.N.*, 74: 298, fig. 190. - Thys van den Audenaerde, 1967: 114, fig. 34; 1968: 126. - Miller, 1981: 8; - Maugé, 1986: 377. - Harrison and Miller, PEDALO in press.

Nematogobius ansorgsii: Hoese and Winterbottom, 1979, *Life Sci. occ. Pap. Roy. Ontario Mus.*, 31: 7.

Comparative examination of non-type material

The examined non-type material had previously been identified as either *N. maindroni* or *N. ansorgii* (see 'Material'). All specimens possess long mental barbels, have their pectoral rays not free from the fin membrane, and the occipital, opercle, preopercle, and suborbital parts of the head are naked. In these respects the specimens distinguish themselves from *N. brachynemus* and show affinity to *N. maindroni* (see above).

The general morphology of the non-type material is similar to that described above in the comparison of *N. maindroni* and *N. ansorgii* types. The specimens have *ca.* 4 rows of unicuspid teeth in the upper and lower jaws, with teeth of the outermost row slightly larger than those of the inner rows.

Table III: Standard lengths and meristics for some non-type specimens previously reported as either *N. maindroni* or *N. ansorgii*. See text for explanation of abbreviations. *: Total count for all segmented rays.

	N.maindroni	N. ansorgii					
	BMNH 1915.4. 13.64	BMNH 1915.3.9.5-7			BMNH 1912.4. 1.174	BMNH 1912.4. 1.507	BMNH 1981. 4.8.17
SL /mm	39.6	54.3	52.3	42.9	48.35	37.4	27.9
D1	VI	VI	VI	VI	VI	VI	VI
D2	I,11	I,11	I,11	I,12	I,11	I,11	I,12
A	I,9	I,9	I,9	I,9	I,9	I,9	I,9
C	15+2	14+3	17*	15+2	14+3	14+3	14+3
P	19	18/19	18	18	17/18	19	18
LL	32+2	32+2	31/32+2	32+2	32+2	32+2	31+2
TR	11	12	10/11	11	10	11	10
PD	9	13/14	≈10	≈12	-	8	5

Meristic features of non-type and aforementioned type material usually have very similar ranges in values (Tables II and III), or any differences are too marginal to warrant specific distinction (eg., D2, P, LL). Predorsal scale counts are more variable than other meristics, but this variability could be accounted for by small ontogenetic increases in predorsal scale number.

In those non-type specimens where the head lateral-line system is well preserved, the canal pore and sensory neuromast arrangements are essentially comparable to those of the type specimens (Fig. 1A-D). Minor differences in the extent of some neuromast rows exist; however, these are more typical of limited intraspecific variabilty than of interspecific differences.

The pigmentation of some non-type material is quite distinct. The specimens are light brownish, and bear dark spots on the flanks forming 7 to 9 cross-bars which are darkest at the lateral midline. The most posterior bar marks a dark base to the caudal fin. The pectoral fin bears a dark spot on the dorsal margin of its base. These pigmentation patterns are not significantly different from those of the *N. maindroni* / *N. ansorgii* types (see above).

In summary, the non-type material exhibits morphological variation which is mostly comparable to that seen between the types of *N. maindroni* and *N.*

ansorgii. This supports the view that the aforementioned type specimens are minor variants of the same morphological species, and the synonymy of *N. ansorgii* Boulenger with *N. maindroni* (Sauvage) is valid.

Habitat and distribution of *N. maindroni*

Benthic, inhabiting inshore marine, brackish, and fresh waters. Commonly found in estuaries, but may freely enter freshwaters and has been reported from backwaters of some West African river systems, sometimes at a considerable distance from the sea. The type locality is Senegal, and the species occurs in West African Basins from Senegal to Angola; the type locality for the synonymous *N. ansorgii* is the Bengo River at Cabiri, Angola.

One specimen (BMNH 1981.4.8.17), definitely of this species, is labelled as collected by A.J. Hopson from "apparently Ferguson's Gulf, Lake Rudolf" (= Lake Turkana). Since there is no other record of this species occurring in East Africa, and it seems there is every possibility of a mixing of West and East African collections made by this collector (Howes, pers. comm.), the Lake Turkana locality given for this specimen should be disregarded.

Acknowledgements. - The author gratefully acknowledges the hospitality of staff and students working at the following institutes: Muséum national d'Histoire naturelle de Paris (Ichtyologie générale et appliquée, and ORSTOM); Koninklijk Museum voor Midden Afrika, Tervuren, Belgium, (Ichthyology and Mammalogy); British Museum (Natural History), London, (Fish Section). Dr. P.J. Miller made available information from his contribution to the forthcoming CLOFETA. Dr. G.G. Teugels and Miss J.K. Skelton kindly provided diverse assistance. I am particularly grateful to G.J. Howes for helpful discussion and critical reviewal of the manuscript.

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Reçu le 09.08.1989
Accepté pour publication le 02.01.1990.